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~~Gemstones~~ Background of the Invention

The invention concerns ornamental stones or gemstones for pieces of jewelry.

Gemstones, particularly precious stones, are cut or uncut
5 before they are fastened into a setting, in order to reflect light, which will cause a gemstone to shine. This requires, however, a minimum size and clearness of the gemstone. Approximately two-thirds of the prospected diamonds are not suitable for the manufacture of gemstones through grinding, because they either have too small a
10 solidity or depth, or because of their color, or because they are utilized only industrially (for technical purposes).

Artificially manufactured diamond layers, produced through the CVD process, are either too expensive or too thin to produce cut gemstones, for example, brilliant stones, therefrom.

15 Thus, the problem facing the present invention is how to impart suitability for jewelry to those natural and artificial gemstones, in particular diamonds, which can be used only for technical or industrial purposes.

Summary of the Invention

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This problem is solved by the present invention in that at
20 least one a preferably smooth visible surface of the gemstone is provided with a structured and preferably shiny substance or

material layer, preferably a precious metal or titanium nitride layer. The visible surface can be constructed from the naturally occurring surface of a mineral, such as it is crystallized naturally or synthetically (CVD, PKD).

5 The structured material layer which is produced according to the invention with a lithography process imparts not just an attractive appearance to the gemstone. The stone's body, for example, can be a natural stone such as a completely raw diamond, one cut from a stone slab severed from natural stone cut with laser
10 technology, one produced according to the CVD technology on a substrate, preferably a silicon separated diamond stratum, or a polycrystalline diamond aggregate (PKD). The structuring of the material layers can be adjusted, such as to be level, concave and/or convex, as well as having preferably smooth surfaces, according to
15 the wishes of the purchasers of a stone created by the invention. This structuring can thereby accommodate a piece of jewelry, in which, for example, a portrait, an astrology sign, an ornament or so forth might be displayed. A transparent protective layer, preferably produced from CVD technology, can be used on the material layer
20 in order to prevent the structuring from being damaged.

CVD diamond synthesis offers particular advantages with the

manufacturing of the gemstones of the present invention. With this synthesis, diamond surfaces can be created, which cannot be obtained either in nature or with other synthesis processes. While natural diamonds with visible surfaces of 100 mm² are a rarity,

5 gemstones with visible surfaces of, for example, 300 mm and even greater, can be made with the help of CVD diamond synthesis. These stones also make possible complex structuring of the material layer, such as for example for diamond pendants which hold pictures. While natural diamonds are discovered as individual

10 crystals, CVD diamond layers are reproduced via adjustment of the synthesis parameters. This has the advantage, among other things, that on the basis of CVD diamond synthesis, serial editions of jewelry pieces can be manufactured. A further advantage of CVD diamond synthesis is the possibility of varying the coloring of the

15 framed diamond via the synthesis parameters. Likewise, the desired stone qualities for the structuring can be controlled to produced various contrasting tones, such as black, brown, gray and so forth.

Brief Description of the Drawings

Q An embodiment of the invention is illustrated in the

20 accompanying figure, which shows a schematic sectional view of a gemstone.

Description of Preferred Embodiments

The picture or model that is to be placed on the visible face

1 of a gemstone is digitalized with a scanner and stored in a computer. In an image editing program, the gray portions of the stored picture are erased, in order to produce a black and white
5 picture, from which a photo mask is created.

A retention intermediary 4, for example, a titanium or chromium layer, is disposed, in order to obtain a secure binding of the to be deposited material layer, for example gold layer 5 with the diamond, on the visible surface 1 of the gemstone, for example, a
10 diamond layer 3, which is disposed on a silicon substrate 2 and which either remains on the substrate 2 or via a high SP2 portion in the layer appears dark. The structure 6 of the gold layer 5, i.e., for presentation of a picture, is obtained in a known manner: a photo lacquer or varnish is applied on this layer 5, the lacquer bound on
15 and the photo mask applied on the lacquer so that the photo lacquer is exposed through the mask. After the removal of the unexposed area of the photo lacquer, the structuring of the gold layer 5 through plasma etching in an argon plasma follows. On the structured gold layer 5, a transparent protective layer 7 is applied.

20 The invention is not limited to the described examples. For one skilled in the art, it implies commonly known modifications. So

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either a natural or artificial stone as the medium of a structured material layer for a gemstone of the present invention is suitable, provided a sufficient contact between stone and structure is given. It can be arranged also as several differing material layers on a

5 visible surface, next to or overlapping one another, whereby with corresponding, or congruent, structuring, in particular with the overlapping material layers, holograms can be obtained. The gemstones of the present invention can serve, further, as ornaments or decorations for furnishings or personal effects, such as clocks,

10 vases and so forth or even form the face of a clock, preferably of a wrist watch.

Patent claims: (Literal translation)

1. Gemstone, characterized by at least one visible surface (1) as a support for a structured material layer (5).
2. Gemstone according to claim 1, characterized in that the visible surface (1) is smooth.
3. Gemstone according to claim 1 or 2, characterized in that the material layer (5) is shiny.
4. Gemstone according to claim 1, 2 or 3, characterized in that the material layer (5) is composed of a precious metal.
5. Gemstone according to claim 1, 2 or 3 characterized in that the material layer (5) is composed of titanium nitride.
6. Gemstone according to any of the foregoing claims, characterized by a metallic layer as a retention intermediary (4) between the visible surface (1) and the material layer (5).
7. Gemstone according to claim 6, characterized in that the retention intermediary (4) is a titanium or chromium layer.
8. Gemstone according to any of the foregoing claims, characterized in that its body comprises a diamond layer 3 manufactured from a CVD process as a support for the material layer (5).
9. Gemstone according to one of the claims 1 through 7,

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characterized in that its body comprises a polycrystalline diamond aggregate (PKD) as a support for the material layer (5).

10. Gemstone according to any of the foregoing claims, characterized in that its visible surface(s) (1), is/are level, concave
5 and/or convex.

11. Gemstone according to any of the foregoing claims, characterized in that a transparent protective layer (7) is applied on the material layer (5).

12. Gemstone according to claim 11, characterized in that
10 the protective layer (7) is a CVD-layer and is composed of corundum or diamond.

13. Gemstone according to any of the foregoing claims, characterized in that its body forms the face of a clock, in particular a ring, wrist or jewelry clock.

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